

27

11. The system according to claim 1, wherein said urine sensor includes a drop rate sensor.

12. A system for use in resuscitating a patient comprising:

a urine sensor;

an infusion pump;

a timer; and

a processor connected to said urine sensor, said infusion pump, and said timer, said processor having

means for calculating an infusion rate in response to a signal from said timer and based on at least the current

infusion rate, the current urinary output, infusion rate model based constants, the patient's weight, the percentage of total body surface area, and a Gaussian function centered on a target urinary output, and

means for controlling operation of said infusion pump based on the calculated infusion rate.

13. The system according to claim 12, wherein the infusion rate model based constants include an infusion rate constant and a urinary output constant.

14. The system according to claim 12, further comprising a display, and

said processor further includes means for driving said display and receiving information from said display of information entered by a user including an infusion rate different than the infusion rate calculated, and

said controlling means operates the infusion pump at the different infusion rate received from the user until a new infusion rate is received or calculated.

15. The system according to claim 12, further comprising a selector with at least two positions including a closed loop position and a semi-closed loop position, said selector is in communication with said processor.

16. The system according to claim 12, wherein said calculating means uses the following equation

$$I_t = I_{t-1} + e(t) \times \frac{IRC_t}{UOC_t} \times Y_{weight} \times Y_{tbsa} \times G_{UO}$$

where  $I_t$  is the new infusion rate,  $I_{t-1}$  is the last infusion rate,  $e(t)$  is the urinary output error,  $IRC_t$  is the infusion rate constant at time t based on the hours post burn,  $UOC_t$  is the

28

urinary constant,  $Y_{weight}$  is a modifier based on the patient's weight,  $Y_{tbsa}$  is a modifier based on the percentage of the total body surface area, and  $G_{UO}$  is the Gaussian function based on the target urinary output.

17. The system according to claim 16, wherein the Gaussian function is calculated using an end point of a target urinary output range furthest from the current urinary output, where the Gaussian function is calculated using

$$G = 1 - Ae^{-(X-B)^2/C^2}$$

where A is set to 1; X is set to the current urinary output; B is set to the furthest end point of the target urinary output range; and C is set to 5.

18. The system according to claim 12, further comprising means for notifying medical staff when a problem has arisen with at least one of the patient and the system.

19. A system for use in resuscitating a patient comprising:

a urine sensor;

an infusion pump;

receiving means for receiving patient data including percentage of total body surface area burned and time since the patient was burned;

first means for calculating an initial infusion rate based on at least the received patient data;

second means for calculating a urinary output error based on a difference between a target urinary output and a current urinary output provided by said urine sensor;

third means for calculating a new infusion rate based on at least the calculated urinary output error multiplied by a constant calculated in part based on an exponential function with the input of hours post burn for the patient with the result being added to the current infusion rate;

outputting means for outputting the new infusion rate to said infusion pump; and

a timer for controlling the operation of said second means, said third means and said outputting means.

20. The system according to claim 19, further comprising a processor having said receiving means, said first means, said second means, said third means, and said outputting means.

\* \* \* \* \*